PATENT SPECIFICATION

DRAWINGS ATTACHED

937,626

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COMPLETE SPECIFICATION

Improvements relating to Carburetors

I, ROBERT ARTHUR GREENE, of Suite 4,55C, Seabreeze Blvd., Daytona Beach, Florida, United States of America, a citizen of the United States of America, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to carburetors for internal combustion engines and in particular to carburetors having jet means the level of which is adjustable.

According to the present invention a carburetor for an internal combustion engine has an air induction passage extending axially therethrough leading to the engine and a valve which is located in the passage for controlling the passage and jet means which are located in the passage for supplying fuel to the air moving through the passage with a float controlled fuel chamber connected to the jet means for supplying fuel thereto; wherein, the jet means are arranged in said passage for vertical movement therein to change the level of the jet means with respect to the level in the said chamber thereby to vary the rate of fuel flow through said jet means.

Preferably the jet means comprise a plurality of individual jets distributed in a plane extending at right angles to the direction of movement of said jet means.

The jets are preferably arranged in a spiral path starting in about the center of the passage and spiraling outwardly, and the passage itself is preferably circular and is advantageously under the control of a diaphragm valve so that the jets are uncovered in succession.

In a particular embodiment of the present invention the jets are arranged in a single unitary carrier which is vertically movable in the air induction passage, while a float controlled fuel chamber is connected to the jets to supply fuel thereto. The raising and lowering of the jets in the passage changes the rate of fuel flow therethrough, and thus changes the richness of the mixture being supplied through the carburetor to the engine.

A carburetor of the present invention can be relatively simple in structure and has the advantage of being applicable in most or all situations due to its wide range of adjustability.

Embodiments of the invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a vertical sectional view through a carburetor constructed according to my invention;

Figure 2 is a vertical section indicated by line 2—2 on Figure 1 showing a mechanism for adjusting the carburetor jets;

Figure 3 is an elevational view showing the adjusting lever for the diaphragm of the carburetor and the jets on the outside of the carburetor;

Figure 4 is a perspective view showing the jet adjusting mechanism;

Figure 5 is a plan sectional view indicated by line 5—5 on Figure 1;

Figure 6 is a plan sectional view indicated by line 6—6 on Figure 1;

Figure 7 is a vertical sectional view indicated by line 7—7 on Figure 3;

Figure 8 is a plan sectional view showing the jets as indicated by line 8—8 on Figure 1,

Figure 9 is a plan sectional view showing the iris diaphragm of the present invention and is indicated by line 9—9 on Figure 1;

Figure 10 is a fragmentary view showing a manner in which the jets are closed by the diaphragm when the jets are completely up;

Figure 11 is a view similar to Figure 10

[*Price 4s. 6d.*]

but showing an arrangement wherein the iris diaphragm is supported by a spring so that it will move downwardly into sealing engagement with jets therebeneath, and

Figure 12 is a perspective view similar to Figure 4 but showing a different mechanism for adjusting the jets.

Referring to the drawings more in detail, Figure 1 shows a vertical section through a carburetor according to my invention, and in Figure 1 the lower end of the carburetor is attached to manifold 10 through which the fuel-air mixture passes to the cylinders. The upper end of the carburetor has attached thereto a conventional air cleaner 12 which removes dust and foreign particles from the air drawn into the carburetor.

Between air cleaner 12 and manifold 10 the carburetor consists of a vertical tubular portion 14 and adjacent the air cleaner 12 is an iris type diaphragm 16 which is adjustable for varying the air inlet opening thereby to control the amount of fuel supplied to the engine thereby regulating the engine speed. The iris type diaphragm is adjustable to any position by a lever 18 fixed to a shaft 20 and adapted for actuation by a linkage 22 leading to the engine accelerator. The particular construction of the iris type diaphragm is not disclosed but it will be understood that it could be of substantially any conventional type.

Immediately beneath diaphragm 16 is a jet assembly 24 which comprises a vertically extending center tube 26 and laterally extending jet supporting tubes 28 at the upper end of tube 26. Diagonally extending tubes 30 are also provided which support the outer ends of tubes 28 and which also provide a flow path for fuel to the outer ends of tubes 28 so that these tubes will be adequately supplied with fuel throughout their entire lengths due to the supply to both ends thereof.

Tube 26 at the lower end is sealed by seal 32 to a stationary tube 34 within which tube 26 is vertically slidable. Spring 36 urges tube 26 upwardly so that it will normally engage the bottom of diaphragm 16 so that the jets are closed off.

Tube 34 has attached to the bottom thereof a conduit 38 that leads to the bottom chamber 40 which is supplied with raw fuel from a fuel line 42. The connection of line 42 with chamber 40 is controlled by a valve 44 that is under the influence of float 46, according to well known practices, so that the fuel level in chamber 40 is maintained substantially constant at all times.

The aforementioned tubes 28 which have been referred to as jet supporting tubes have mounted on their upper sides a plurality of jets 48 which are distributed therein as indicated in Figure 8 so that as the iris diaphragm 16 opens the jets will be successively uncovered and subjected to the air stream being drawn through the opening in the diaphragm. In Figure 8 it will be noted that there is a jet 48 on the center on the axis of tube 26 and that the other jets distributed along tubes 28 will be progressively uncovered as the diaphragm opens, as indicated by the dot-dash circles which show various diaphragm openings between the diaphragm closed and diaphragm open positions.

A feature of the present invention resides in the vertical adjustability of the jet assembly 24. This jet assembly is movable downwardly in order to bring the jet closer to the level of the fuel in chamber 40 so as to increase the amount of fuel drawn from the jets under predetermined air flow conditions downwardly through member 14. This is important in that it enables the mixture being delivered to the engine to be varied between predetermined thin and rich conditions whereby the engine can be efficiently operated when it is cold and also whereby the mixture will be made richer as engine speed increases and under which conditions the usual carburetor arrangement permits some leaning out of the mixture to the detriment of engine performance.

The vertical adjustability of the jet assembly is under the control of the diaphragm adjusting mechanism that is actuated by the engine accelerator and is also under the control of a mechanism, for adjusting the jet level without affecting the diaphragm, which enriches the mixture and, thereby serves somewhat the same purpose as a choke mechanism and will hereinafter be referred to as such.

As to the adjustment of the jet assembly by the accelerator mechanism, shaft 20 is journaled in the carburetor as at 50 and has an offset end part 52 to which is connected a link 54 extending downwardly therefrom and attached to a bifurcated arm 56 pivoted to the side wall of the carburetor at 58. The other end of the arm 56 engages a collar 60 which is slidable on tube 26.

Collar 60 at a predetermined point in its movement downwardly along tube 26 as the iris diaphragm is opened by rotation of shaft 20, engages a second collar 62 that is fixed to tube 26 and following such engagement between the collars, further movement downwardly of collar 60 will cause downward movement of the jet assembly thereby increasing the amount of fuel drawn through the jets by the air stream being drawn downwardly through the carburetor.

It will be understood that the spacing of collars 60 and 62 could be adjusted to cause engagement therebetween at any desired point during the travel of collar 60, and in certain cases it may be desired for these collars to be in engagement at the time the diaphragm is completely closed, and under other circum-

stances it may be preferable for collar 60 to have a predetermined amount of travel before it engages collar 62. In any event, during the movement of the diaphragm from closed to open position, there will be an accompanying downward movement of the jet assembly.

It has been mentioned previously that the jet assembly is also under the control of the choke adjustment and this is accomplished by connecting the choke adjustment with a lever 70 attached to a shaft 72 that has an offset end part 74 and between which end part and collar 62 there is connected the link 76. One or both ends of link 76 is provided with slots 78 so that for any adjusted position of shaft 72, the collar 62 and the jet assembly will be free to slide downwardly when collar 62 is engaged by collar 60. This arrangement permits adjustment of the carburetor for starting under cold weather conditions by moving the jet assembly downwardly a predetermined distance thereby to increase the fuel flow from the jets while at the same time the jet assembly will still be under the control of the throttle mechanism after the engine speed reaches a predetermined amount.

Other mechanisms can be employed for adjusting the jet assembly so that it is under the joint control of the accelerator and choke. Such a modification is illustrated in Figure 12 wherein pins 80 extend outwardly from jet assembly 82 and are engaged by the hooked arms 84 that is attached to shaft 86 pertaining to the accelerator, and 88 connected with shaft 90 pertaining to the choke. This arrangement also permits either of the choke or accelerator to move the jet assembly downwardly while the other therof will also be effective.

The jets 48 are normally closed by the diaphragm when in their uppermost position as indicated in Figure 10 and to increase the sealing effect the jets may be made of resilient material such as rubber or a rubber-like plastic, if so desired. Silicone rubber would be suitable for this purpose since it is both resistant to high temperature and is resilient and abrasion resistant.

As a further modification, the iris diaphragm may be yieldingly supported as in Figure 11. In Figure 11 the iris diaphragm 92 is supported by a spring 94 so that the diaphragm can yield downwardly under the influence of the unbalanced pressure thereon when the engine is running so as to seat against jets 96 except when these jets are moved to a substantial distance downwardly below the diaphragm.

Even when the diaphragm is not engaged with the jets, the jets will be effective will be the ones located in the air stream passing through the iris diaphragm. Fuel will be supplied through these jets due to the suction created by the movement of air through the carburetor while the jets disposed outwardly beyond the edge of the diaphragm opening will be substantially ineffective for supplying fuel to the air stream.

From the foregoing it will be appreciated that my invention provides a carburetor and a method of carburetion that will provide additional and proportionate streams of gasoline or a like fuel through a plurality of jets that are made successively effective in a predetermined ratio to the degree of opening of the throttle mechanism which, in the particular arrangement illustrated, comprises an iris diaphragm air control.

According to my invention an exact ratio of air to gas is maintained for every position of the throttle and this leads to improved engine efficiency. In addition, the richness ratio can be adjusted to any predetermined setting and is also increased for increased throttle openings thereby to offset the tendency of the mixture to lean out under rapid air flow conditions through the carburetor at high engine speeds.

The usual automatic choke mechanism now employed with conventional type carburetors can be eliminated and likewise the usual manual choke arrangement that tends to increase the suction at the jets can be eliminated, this also tending towards increasing the operating efficiency of the carburettor and engine.

WHAT I CLAIM IS:—

1. A carburetor for an internal combustion engine which has an air induction passage extending axially therethrough leading to the engine and a valve which is located in the passage for controlling the passage and jet means which are located in the passage for supplying fuel to the air moving through the passage with a float controlled fuel chamber connected to the jet means for supplying fuel thereto; wherein, the jet means are arranged in said passage for vertical movement therein to change the level of the jet means with respect to the level in the said chamber thereby to vary the rate of fuel flow through said jet means.

2. A carburetor according to Claim 1 in which said jet means comprises a plurality of individual jets distributed in a plane extending at right angles to the direction of movement of said jet means.

3. A carburetor arrangement according to Claim 1 or 2 in which said jet means is a jet unit having connected thereto from outside the carburetor two linkages each operable independently for moving the said unit vertically in said passage.

4. A carburetor arrangement according to Claim 3 in which one of said linkages is connected to said valve and said jet unit and constitutes a throttle linkage while the other linkage is connected only to the said jet unit.

5. A carburetor arrangement according to Claim 1—4 in which said valve is moveable in a transverse direction in said air induction passage.

6. A Carburetor arrangement according to Claim 2 in which said valve is moveable in a transverse direction in said air induction passage and is so disposed relative to said jets as to uncover the jets in succession as the valve moves in the opening direction.

7. A carburetor arrangement according to Claim 6 in which said valve is an iris type diaphragm.

8. A carburetor arrangement according to Claim 7 in which said passage is circular in cross section and said jets are arranged in a path spiralling outwardly from the center of the said passage, and said diaphragm opens from the center of said passage outwardly.

9. A carburetor arrangement according to Claims 6—8 in which said jets are carried by a unitary assembly spring urged upwardly toward said valve, said assembly comprising a vertical central fuel supply tube, radial tubes leading from the upper end of the vertical tube and having the jets mounted therein, and a throttle linkage connected to said valve for opening and closing the same and also connected with said jet assembly so as to move the jet asembly downwardly as the valve opens.

10. A carburetor arrangement according to Claim 9 in which the connection of the throttle linkage to the jet assembly is an abutting connection effective only for moving the jet assembly downwardly and the said connection including lost motion.

11. A carburetor arrangement according to Claim 9 or 10 in which there are inclined tubes leading from the central tube upwardly and outwardly to the outer ends of the radial tubes.

12. A carburetor arrangement according to Claims 1 to 11 in which said valve is located at the tops of said jets when the latter are in their uppermost position, and is resiliently supported in said air passage so as to be urged downwardly by air flow in the passage so as to bear against said jets.

13. A carburetor arrangement according to Claims 9 to 12 in which said central tube has pin means projecting therefrom, a spring urging the tube upwardly, a pair of shafts each having an arm in the carburetor engaging the upper sides of said pin means, and a throttle linkage being connected to one said shaft and to said valve and another linkage being connected only to the other said shaft.

14. A method of creating a fuel air mixture for an internal combustion engine which comprises; supplying air through a passage to the engine, placing jet means in the passage, controlling the air supply by means of a valve located in the passage in advance of the jet means and supplying fuel to the jet means from a constant level source whereby the air stream draws fuel from the jet means to create a combustible fuel air mixture, and adjusting the jet means vertically to vary the rate of fuel flow therethrough under any given conditions of air flow through the passage, the said passage extending in the direction of movement of the jet means.

15. The method according to Claim 14 in which the jet means comprise jets distributed in a plane which is perpendicular to the direction of air flow.

16. A carburetor arrangement substantially as described herein with reference to and as illustrated in the accompanying drawings.

17. A method of carburetion substantially as described herein with reference to and as illustrated in the accompanying drawings.

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2 SHEETS

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SHEETS 1 & 2

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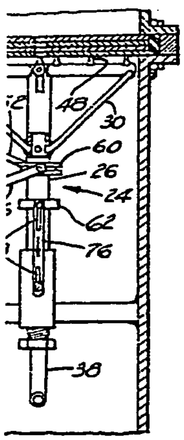

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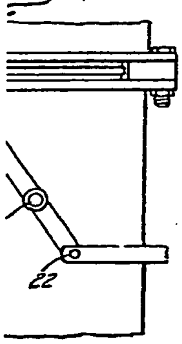
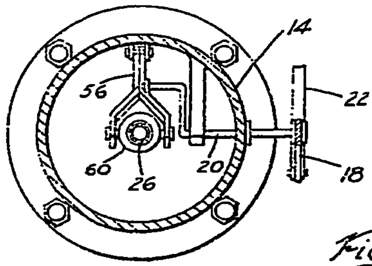


Fig-5



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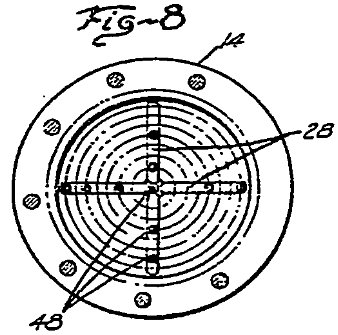
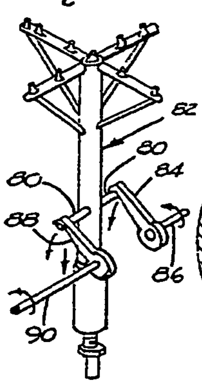


Fig-12



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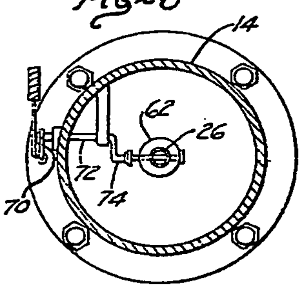

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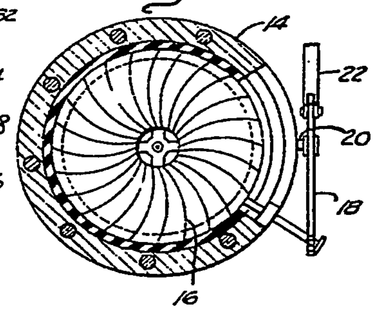

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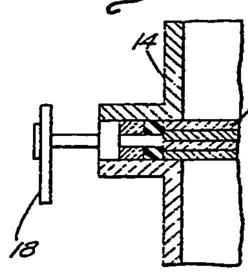


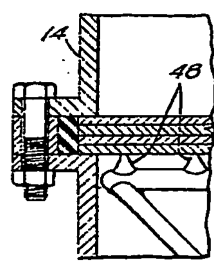


Fig-10

Fig-11

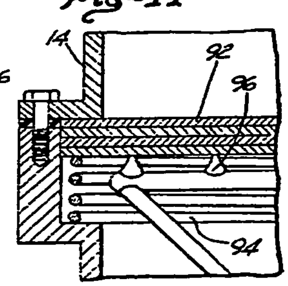


Fig-1

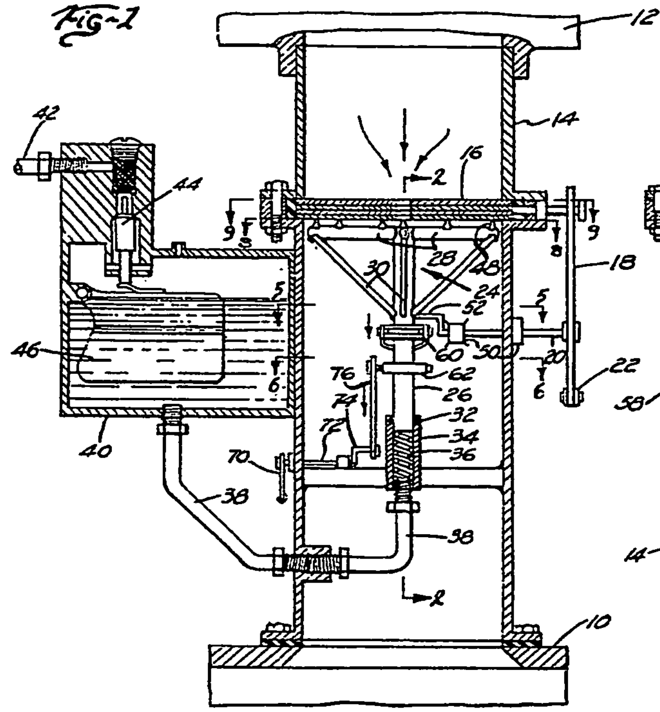
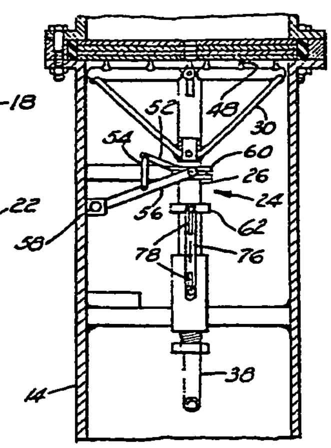


Fig-2



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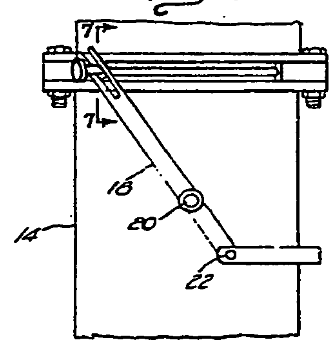

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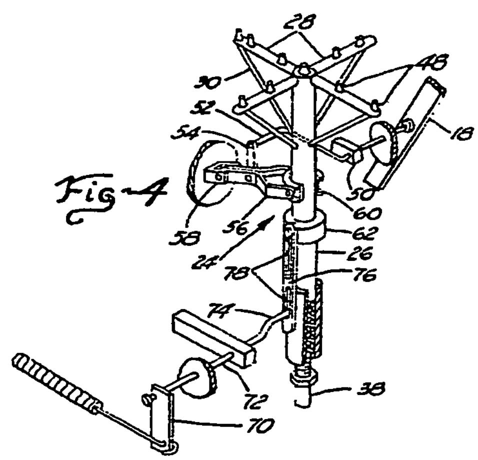
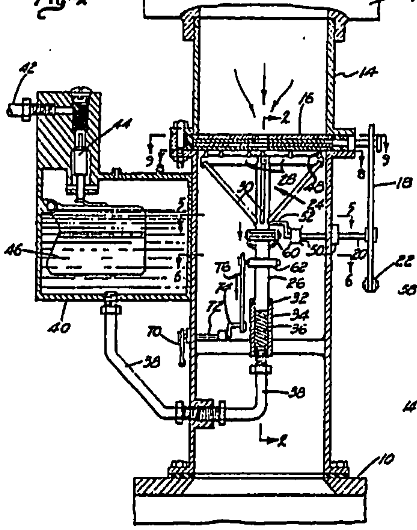


937,626 COMPLETE SPECIFICATION
2 SHEETS This drawing is a reproduction of the Original on a reduced scale.
SHEETS 1 & 2

Fig-1



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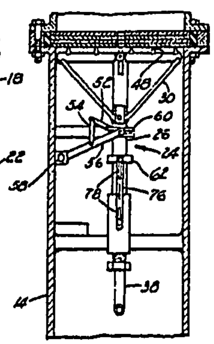

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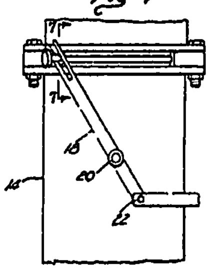

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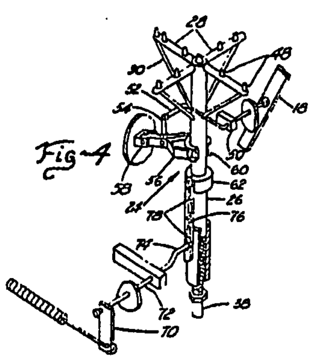

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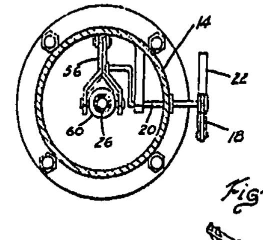

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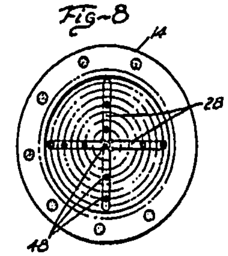

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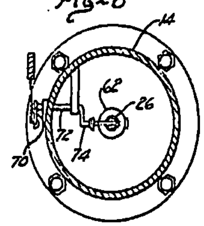

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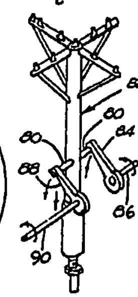

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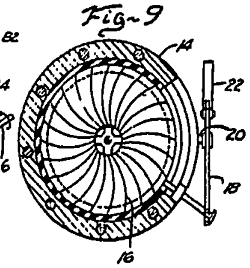

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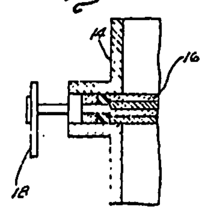

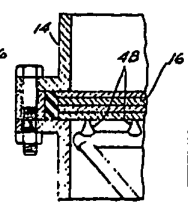

Fig-10

Fig-11